DOCUMENT RESUME

ED 350 795 EC 301 608

AUTHOR Scherer, Marcia J.
TITLE Psychosocial Factors Associated with the Use of Technological Assistance.
PUB DATE Aug 92
NOTE 13p.; Paper presented at the Annual Convention of the American Psychological Association (100th, Washington, DC, August 14-18, 1992).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adaptive Behavior (of Disabled); Adults; *Assistive Devices (for Disabled); *Equipment Utilization; Followup Studies; Individual Development; Longitudinal Studies; Males; *Neurological Impairments; *Personality Traits; Self Evaluation (Individuals)
IDENTIFIERS Impairment Severity; *Spinal Cord Injuries

ABSTRACT

This follow-up study was conducted to assess changes in functioning and adjustment over time of individuals with spinal cord injuries who had participated in 1986 and 1988 studies. The original studies interviewed five adult males with quadriplegia about the use of their assistive technologies and about how easily, comfortably, and effectively they operated them and under what conditions and circumstances they experienced difficulties. In the follow-up study, administration of the Personal Capacities Questionnaires to users and non-users of assistive technologies found that users had higher levels of functional capacity and rated the severity of their disability lower than did non-users. Administration of the Taylor-Johnson Temperament Analysis found no clear patterns emerging, though over time, users appeared to be slightly more submissive, hostile, and impulsive than non-users. Results indicate that people with disabilities adjust in various ways over time, that there is developmental growth, and that psychological factors are important in the understanding of short-term and long-term adjustment. (Contains 13 references.) (JDD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Psychosocial Factors Associated with the Use of Technological Assistance

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED350795

Marcia J. Scherer, Ph.D.
Rochester Institute of Technology
Rochester, NY 14623

Paper presented at the 1992 Annual Convention

of the

American Psychological Association

Washington, DC

EC 301605

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Marcia J. Scherer
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Psychosocial Factors Associated with the Use of Technological Assistance

Abstract

Studies were done in 1986 and 1988 that compared assistive technology (AT) users and non-users on their functioning and temperament. A follow-up study was conducted in 1992 with all participants with spinal cord injuries to assess changes in functioning and adjustment over time. The users of ATs consistently display better overall functioning and adjustment.

The goals of such legislation as the Americans with Disabilities Act (A.D.A.) are to open up opportunities to increased numbers of persons with disabilities in the areas of transportation, public accommodations, communication and employment. Such goals have become attainable largely because of technological advances that have made it possible for persons with disabilities to physically overcome limitations in their functioning. Technological assistance for individuals basically falls into the following five broad groups:

1. **Assistive technologies (AT)** designed to enhance an individual's functioning and independence and independence. Environmental control systems and power wheelchairs are examples of these.

2. **Educational technologies** (distance learning, videodisc training courses, etc.) that many students encounter today -- regardless of their age.

3. **General technologies encountered by everyone during typical day-to-day activities** (home appliances, automatic bank tellers, supermarket scanners, etc.).

4. **Health technologies** which serve to diagnose, monitor and manage physiological functions (kidney dialysis machines, pacemakers, respirators, etc.).

5. **Worksite Technologies**, such as computerized security systems, information systems networks (voice and data), etc. that are becoming increasingly commonplace.

The use of today's technologies ranges from those people who use technologies regularly and with great satisfaction to those who use them infrequently and with reluctance. Other people avoid technologies entirely or may try them only to abandon their use. Just as people's use varies considerably, so does their degree of comfort in use. Since technological assistance was meant to be

BEST COPY AVAILABLE

helpful, many people have been curious about its non-use or less than optimal use since past experiences with technologies affect a person's predisposition to the use of other technologies in the future.

A few researchers have begun to investigate why technological assistance is avoided or abandoned. Of particular concern is the use of technological assistance by persons with disabilities as the kinds of help they require is increasingly being provided by technologies.

Since 1986, five males with quadriplegia from spinal cord injuries have participated in a longitudinal study exploring their use of assistive technologies. All participants were interviewed about the use of their technologies and how easily, comfortably and effectively they operated them and under what conditions and circumstances they experienced difficulties.

The course of each spinal cord injury is unique. Not only do few similar injuries result in the same losses of motor function and sensation, but individuals react and adjust to their injuries in a variety of ways and over varying lengths of time (Krause & Crewe, 1987; Trieschmann, 1988). Accordingly, respondents were asked to complete the Taylor-Johnson Temperament Analysis and the Personal Capacities Questionnaire.

Background and Purpose

A study exploring assistive technology (AT) use was conducted in 1986 and 1988 with five women with severe, four quadrant involvement, cerebral palsy (CP) who ranged in age from 26 to 42 years old and five men with severe, four quadrant involvement, spinal cord injuries (SCI) who ranged in age from 25 to 37 and who were at least four years post injury. All participants had been equipped with one or more ATs and were pre-selected by contact therapists as being either an AT user (2 SCI, 3 CP) or AT non-user (3 SCI, 2 CP). Each participant was living independently or with family. As much as possible, the effects of variations in physical involvement, age, and the existence of cognitive impairment were controlled.

The original and follow-up research was designed to provide an in-depth investigation of a small number of subjects who either use or do not use assistive devices rather than a more superficial study

of many subjects. The techniques employed were interviewing, observation, and testing of samples of people with spinal cord injuries and cerebral palsy. Since the number of subjects for the research study is small, data analyses are descriptive only and focus on the presentation of individual case examples organized into participant types.

The purpose of both follow-up studies was to answer the question: How do AT users and non-users with spinal cord injuries compare over time in functional capacities and temperament?

Method

As with the original research, the general method employed in the follow-up studies was that of a **comparative case study** where two or more case studies are conducted in order to compare and contrast subjects' comments, scores, traits, or behaviors (Bogdan & Biklen, 1982). This approach is more attentive to the qualitative properties of data than to quantitative properties and is based on the assumption that:

> meaning and process are crucial in understanding human behavior, that descriptive data is [sic] what is important to collect, and that analysis is best done inductively (Bogdan & Biklen, 1982, p. 55).

In 1992, previously participating individuals with spinal cord injuries were contacted to complete the same instruments as in 1986 and 1988. All participants agreed to participate in the current study. During the interval since the original 1986 study, there were no major changes in respondent living status with the exception of one male AT user who, upon graduation from college, moved from his family's home to live independently in Berkeley, CA.

As noted in Scherer (1988), additional factors influencing AT use could be assessed by, for example, adding persons with recent spinal cord injuries and then observing their developmental changes. Accordingly, two participants were added in 1988: a) HY, a male with a C5, incomplete injury he received at age 25 and who was one year post-injury in 1988, and b) KR, a female with a C4, incomplete injury received when she was 20 years old and who was three years post-injury in 1988. Both used power wheelchairs, personal computers, modified vans, and a variety of low-tech devices.

Assessment of personal capacities

Each participant was asked to complete the Personal Capacities Questionnaire (PCQ) (Crewe & Athelstan, 1984), a 30-item measure of six functional areas: Adaptive behavior, vocational qualifications, communication, motor functioning, physical condition, and cognitive functioning. Two additional items assess visual impairment and the need for special job requirements. Respondents evaluate each item on a four-point ordinal scale ranging from "no significant impairment" with a score of 0 to three levels of increasing impairment to a maximum score of 3.

Respondents are also asked to read a list of ten personal strengths and check all which they believe apply to them. Finally, respondents are asked to rate their perception of the severity of their disability and their "chances of getting and holding a job" on two Likert scales (7- and 4-point respectively).

A companion instrument, the Functional Assessment Inventory (FAI), is an item-by-item translation of the PCQ into statements completed by a rehabilitation counselor or other treatment specialist familiar with the consumer/subject. The FAI has been used in research on vocational rehabilitation success. The inter-rater reliability of FAI scores has been found to be relatively high, with total score reliabilities of .79 and .80 being reported for ratings provided by counselors viewing videotapes of rehabilitation clients. There is some evidence reported in the FAI manual (Crewe & Athelstan, 1984) for both concurrent and predictive validity of total FAI scores. Field testing of the companion PCQ is currently underway.

Assessment of temperament

Participants were also asked to complete the Taylor-Johnson Temperament Analysis (T-JTA) (1966-1985), a 180-item inventory that profiles the respondent on nine traits (and their opposites): Nervous/composed, depressive/light-hearted, active-social/quiet, expressive-responsive/inhibited, sympathetic/indifferent, subjective/objective, dominant/submissive, hostile/tolerant, and self-disciplined/impulsive. Raw scores on the T-JTA are converted to either percentiles or sten scores by

using general population norm tables, one for males and one for females, provided in the Manual. Special profile forms are provided for plotting T-JTA results.

> Mosher, in **The Seventh Mental Measurements Yearbook** (1972) reports that the T-JTA:
>
> possesses adequate internal consistency and stability over two weeks' time. The factor analysis of the nine traits revealed that each of the scales measures some trait that is distinct from the trait measured by the other scales (p. 572).

Mosher also notes it correlates well with tests designed for similar purposes. Correlations and salient factor loadings with the Minnesota Multiphasic Personality Inventory (MMPI) scales and the scales of the Edwards Personality Factor Questionnaire (16PF) are provided in the 1967, 1980 and 1985 editions of the T-JTA Manual.

Patterns of individual results on the PCQ and T-JTA were compared in order to reveal commonalities or differences in AT use, personal capacities, and temperament.

Results

Changes Over Time in Personal Capacities

Table 1 reports the mean scores obtained from the Personal Capacities Questionnaires (PCQ) as self-reported by the users and non-users in 1986, 1988 and 1992. These represent measures of actual or perceived changes in capacities over the time period studied. A low score on the PCQ corresponds to a high level of functional capacity and high scores indicate diminished capacity.

The areas of most change between users and non-users in 1986, 1988 and 1992 were Adaptive Behavior, Vocational Qualifications, and to a somewhat lesser extent, Motor Functioning and Physical Condition. Users have total PCQ scores at 20 or below; non-users have no total scores below 25. Users also tended to rate the "severity of disability" lower than did the non-users.

The stability in Communication gives some indication of the reliability of responses since none of the participants experienced any significant impairment in this area (although one person, AN, reports some mild hearing loss).

When making comparisons within the participant groups, it can be seen that the non-users reported little or no change in their Motor Functioning over time whereas the two users reported consistently enhanced motor functioning.

One user (AN) rated himself as having less Adaptive Behaviors than in 1986 (during the past two years he graduated from college and has not found a full-time job), whereas the other user has graduated from college during the same interval and has a job in his career area. One non-user, TR, reports improved functioning over time, especially in Adaptive Behavior. In fact, this person had been anxious and reclusive until 1992.

Changes Over Time in Temperament

Table 2 presents the sten scores obtained from the Taylor-Johnson Temperament Analysis (T-JTA) as self-reported by the users and non-users in 1986, 1988 and 1992. All but one of the Attitude scores were within neutral limits, which the 1984 T-JTA Manual interprets as meaning:

> ...[T]he respondent showed little test-taking bias and that he or she answered the questions in a frank, open, and straightforward manner; and that there was little tendency to be either overly self-critical or overly self-favoring (p. 14).

As shown in Table 2, individuals have varied over time on the Taylor-Johnson Temperament Analysis (T-JTA) traits and no clear patterns emerge. It does appear, however, that from 1986 to 1992, the users appear to be slightly more submissive, hostile and impulsive than the non-users.

Consistent with his PCQ profile, TR has demonstrated over time a more adjusted T-JTA profile.

Discussion

The results of this research come from data provided by a small number of individuals. Thus, statistical tests of observed differences were not possible and it cannot be determined if significant differences actually exist between those persons who use and do not use assistive technologies and if the findings are generalizable to the relevant population. Too, results based on personality instruments such as the T-JTA, which were not designed for, nor were normed on, a population of persons with

disabilities, should be interpreted with healthy skepticism. Compounding these difficulties are ones associated with any longitudinal research design: Individuals naturally change over time and many events and larger societal trends cannot be controlled. Still, the consistency of the findings in many important ways suggest that the participants reported their data accurately and that their experiences and perspectives are shared ones. Thus, with the above cautions in mind, several tentative points will be drawn.

The failure of non-user's to report gains in functional capabilities over time may be an outcome of their non-use of ATs and, additionally, may be indicative of their general attitudes toward and adjustment to their disability. The possibility exists that if they had used ATs, their perceptions of their Motor Functioning and overall capabilities in 1988 and 1992 would have been higher.

All individuals who completed the Taylor-Johnson Temperament Analysis in 1986, 1988, and 1992, showed variability over time which was reflective of changes both in their adjustment and circumstances. For example, over the three administrations TR moved closer to a more well-adjusted pattern; AN's profiles reflect his adjustment in moving to California and in changing his career plans. Such results are not definitive by any means, yet they demonstrate that people with disabilities adjust in various ways over time, that there is developmental growth and, consistent with the results of Krause (1992) and Krause and Dawis (1992), psychological factors are important in the understanding of short- and long-term adjustment.

Unlike the majority of people, persons with spinal cord injuries are not able to do many things on impulse. This lack of freedom and choice can foster the kind of submissiveness that both AT users and non-users reported on the T-JTA – something that may not be a problem for some people, but can represent a major change in lifestyle for a young man who took great pride in his freedom and independence.

AN and BE were both active and outgoing young men who enjoyed taking risks. While they present themselves as fighting their limitations, they also report that they are often submissive and "too tolerant." Their T-JTA profiles indicate their drive and fight is competing with a sense of powerlessness.

Perhaps the non-users also feel powerless and have (temporarily) lost their fight. TR exemplified this pattern in 1986 and has gradually become more adjusted. When displaying a "lack of fight," they may frustrate the rehabilitation efforts of their therapists, family, and personal assistants. Thus, their own attitudinal barriers to rehabilitation may significantly interfere with the help and acceptance they need and a sense of being in a perpetual state of stuck can develop.

Implications for Practice

1. There is dynamic interactive relationship among AT use, temperament, and personal capacities and, as the current study shows, this relationship can change over time. Therefore, it may be more prudent to match an individual with an AT, not solely according to how it will enhance functioning and independence in the long term, but how it will affect the individual's quality of life and life satisfaction in the short-term.

2. Successful Ad use depends on the individual's belief they will benefit from using the AT. This belief may need to develop over time. Therefore, understand a potential AT user's expectations of the AT in light of their present capabilities and goals. Does the AT represent opportunity or an inadequate replacement for lost functioning?

3. The majority of rehabilitation efforts today fall into two primary areas: a) The minimization of individual deficits and limitations, and b) the elimination of environmental barriers to independence and assimilation. The former may emphasize individual ATs (such as power wheelchairs and modified vans) whereas the latter looks to macro level environmental accommodations (such as accessible public transportation). Both are necessary for the assimilation of persons with disabilities vocationally, socially, and recreationally.
   Therefore, rehabilitation professionals should have information to assist their efforts in matching consumers with ATs and may want to consider administering such instruments as the PCQ and T-JTA prior to discussing ATs with consumers. Too, an assessment tool has been developed from this research and complimentary copies are available from the author. The assessment instrument, "The Assistive Technology Device Predisposition Assessment (ATD PA)" (Scherer & McKee, 1989), is presently available only as an experimental instrument. It assesses the match among the characteristics of the person, the disability, those of the psychosocial milieu, and those of the AT under consideration and is designed to be a resource for rehabilitation professionals to use in assessing the likelihood of AT use by an individual equipped with a particular device.

It seems there are two opposing forces in rehabilitation today: a) People with disabilities who want more comprehensive care, and b) the realities of a need to contain costs in rehabilitation service delivery. While it may, in fact, be tempting to rely on more technological solutions to rehabilitation, as much as (or even more than) before, people with disabilities say they need "whole person rehabilitation"–especially rehabilitation that acknowledges and works with their emotions and attitudes.

References

Bogdan, R.C. & Biklen, S.N. (1982). Qualitative Research for Education: An Introduction to Theory and Methods. Boston: Allyn and Bacon.

Crewe, N. M. & Athelstan, G. T. (1984). Functional Assessment Inventory Manual. Menomonie, WI: Materials Development Center, University of Wisconsin-Stout.

Krause, J.S. (1992). Life satisfaction after spinal cord injury: A descriptive study. Rehabilitation Psychology, 37(1), 61-70.

Krause, J.S. & Dawis, R.V. (1992). Prediction of life satisfaction after spinal cord injury: A four-year longitudinal approach. Rehabilitation Psychology, 37(1), 49-60.

Krause, J.S. & Crewe, N.M. (1987). Prediction of long-term survival among persons with spinal cord injury: An 11-year prospective study. Rehabilitation Psychology, 32, 205-213.

Mosher, D. L. (1972). Taylor-Johnson Temperament Analysis. In O. Buros (Ed.), The Seventh Mental Measurements Yearbook, (pp. 959-960). Highland Park, NJ: Gryphon Press.

Scherer, M.J. (1986). Values in the creation, prescription, and use of technological aids and assistive devices for people with physical disabilities: Final report to the National Science Foundation (Grant No. RII-8512418). Washington, DC: National Science Foundation.

Scherer, M.J. (1988). Assistive device utilization and quality of life in adults with spinal cord injuries or cerebral palsy. Journal of Applied Rehabilitation Counseling, 19 (2), 21-30.

Scherer, M.J. & McKee, B.G. (1989). But will the assistive technology device be used? Proceedings of the 12th Annual Conference: Technology for the Next Decade. Washington, D.C.: RESNA Press. Author.

Scherer, M. J. & McKee, B. G. (1989). The Assistive Technology Device Predisposition Assessment (ATDPA), Rochester, NY.

Scherer, M.J. & McKee, B.G. (1990). High-tech communication devices: What separates users from non-users? Augmentative and Alternative Communication, 6(2), 99.

Taylor-Johnson Temperament Analysis (T-JTA). (1966-1985). Taylor, Robert M. and Morrison, Lucille Phillips, by Psychological Publications, Inc., 5300 Hollywood Blvd., Los Angeles, CA 90027.

Trieschmann, R.B. (1988). Spinal cord injuries: Psychological, social, and vocational rehabilitation (2nd ed.). New York: Demos Publications.

BEST COPY AVAILABLE

Table 1

Individual Scale Scores* Personal Capacities Questionnaire (PCQ) as Self-Reported by SCI Participants in 1986, 1988, and 1992

		AB 7	VQ 6	Co 3	MF 4	PC 4	Tot	Str	Sev
AT Users									
AN	86	0	4	0	10	5	19	4	1
	88	3	4	1	6	1	16	4	3
	92	1	4	1	7	5	20	0	3
BE	86	0	4	0	10	6	20	3	4
	88	0	2	0	6	4	13	3	4
	92	0	1	0	7	3	12	4	3
AT Non-users									
ST	86	4	4	0	10	7	28	4	5
	88	5	6	0	12	7	32	4	6
	92	7	9	0	12	9	40	4	5
TR	86	16	13	0	8	11	49	3	5
	88	11	16	0	3	6	39	4	5
	92	4	11	0	9	8	34	4	5
SM	86	2	9	0	12	10	33	1	4
	88	5	3	0	11	4	25	1	4
	92	4	5	0	12	5	29	1	5
Recently Injured									
HY	88	2	3	0	8	6	21	4	4
	92	D I D N O T R E S P O N D							
KR	88	2	6	0	12	6	29	3	7
	92	D E C E A S E D							

* The score for each item ranges from 0 (no limitation) to 3 (very or totally limited). Thus, the farther the score from zero, the more limitation there is in that capacity.

Table 2
1986, 1988, and 1992 Taylor-Johnson Temperament Analysis (T-JTA) Sten Scores for SCI Participants

		T-JTA Trait[a]									
Person		**Ner**	**Dep**	**Act**	**Exp**	**Sym**	**Sub**	**Dom**	**Hos**	**Dis**	**Att[b]**
Users of AT											
AN	86	6	6	10	5	8	6	5	5	5	6
	88	8	8	9	4	7	6	4	6	4	4
	92	6	6	8	8	6	6	4	4	4	6
BE	86	6	6	2	4	10	2	2	1	8	5
	88	6	7	5	4	9	1	2	2	4	5
	92	6	7	6	6	8	1	4	2	4	5
Non-Users of AT											
ST	86	8	6	2	3	7	7	6	7	6	4
	88	7	7	2	5	5	8	3	8	6	4
	92	7	8	1	6	6	5	4	7	5	5
TR	86	8	6	1	4	3	7	4	8	4	4
	88	7	6	2	7	2	5	6	6	6	4
	92	6	6	4	8	4	5	6	6	5	6
SM	86	4	4	9	7	7	4	7	6	2	7
	88	4	5	7	6	7	4	4	4	3	6
	92	3	4	6	7	7	4	6	1	8	8
Recently Injured											
HY	88	7	6	7	5	5	6	7	8	6	5
	92	D I D N O T R E S P O N D									
KR	88	5	5	9	6	6	5	8	5	8	6
	92	D E C E A S E D									

[a]5,6 = neutral scores; [b]4-7 = neutral scores